

Ebola haemorrhagic fever

The Ebola virus belongs to the Filoviridae family (filovirus) and is comprised of five distinct species: Zaïre, Sudan, Côte d'Ivoire, Bundibugyo and Reston.

Zaïre, Sudan and Bundibugyo species have been associated with large Ebola hemorrhagic fever (EHF) outbreaks in Africa with high case fatality ratio (25–90%) while Côte d'Ivoire and Reston have not. Reston species can infect humans but no serious illness or death in humans have been reported to date.

Human infection with the Ebola Reston subtype, found in the Western Pacific, has only caused asymptomatic illness, meaning that those who contract the disease do not experience clinical illness. The natural reservoir of the Ebola virus seems to reside in the rain forests of the African continent and in areas of the Western Pacific.

Transmission

- The Ebola virus is transmitted by direct contact with the blood, secretions, organs or other body fluids of infected persons.
- Burial ceremonies where mourners have direct contact with the body of the deceased person can play a significant role in the transmission of Ebola.
- The infection of human cases with Ebola virus through the handling of infected chimpanzees, gorillas, and forest antelopes -- both dead and alive -- has been documented in Côte d'Ivoire, the Republic of Congo and Gabon. The transmission of the Ebola Reston strain through the handling of cynomolgus monkeys has also been reported.
- Health care workers have frequently been infected while treating Ebola patients, through close contact without correct infection control precautions and adequate barrier nursing procedures.

Incubation period: two to 21 days.

Symptoms

Ebola is characterized by the sudden onset of fever, intense weakness, muscle pain, headache and sore throat. This is often followed by vomiting, diarrhoea, rash, impaired kidney and liver function, and in some cases, both internal and external bleeding. Laboratory findings show low counts of white blood cells and platelets as well as elevated liver enzymes.

Diagnosis

Specialized laboratory tests on blood specimens detect specific antigens and/or genes of the virus. Antibodies to the virus can be detected, and the virus can be isolated in cell culture. Tests on samples present an extreme biohazard risk and are only conducted under maximum biological containment conditions. New developments in diagnostic techniques include non-invasive methods of diagnosis (testing saliva and urine samples) and testing inactivated samples to provide rapid laboratory diagnosis to support case management during outbreak control activities.

Therapy and vaccine

- Severe cases require intensive supportive care, as patients are frequently dehydrated and in need of intravenous fluids or oral rehydration with solutions containing electrolytes.
- No specific treatment or vaccine is yet available for Ebola haemorrhagic fever. Several potential vaccines are being tested but it could be several years before any is available. A new drug therapy has shown some promise in laboratory studies and is currently being evaluated. But this too will take several years.

- Experimental studies using hyper-immune sera on animals have shown no protection against the disease.

Containment

- Suspected cases should be isolated from other patients and strict barrier nursing techniques implemented.
- Tracing and following up people who may have been exposed to Ebola through close contact with patients are essential.
- All hospital staff should be briefed on the nature of the disease and its transmission routes. Particular emphasis should be placed on ensuring that invasive procedures such as the placing of intravenous lines and the handling of blood, secretions, catheters and suction devices are carried out under strict barrier nursing conditions. Hospital staff should have individual gowns, gloves, masks and goggles. Non-disposable protective equipment must not be reused unless they have been properly disinfected.
- Infection may also spread through contact with the soiled clothing or bed linens from a patient with Ebola. Disinfection is therefore required before handling these items.
- Communities affected by Ebola should make efforts to ensure that the population is well informed, both about the nature of the disease itself and about necessary outbreak containment measures, including burial of the deceased. People who have died from Ebola should be promptly and safely buried.

Contacts

- As the primary mode of person-to-person transmission is contact with contaminated blood, secretions or body fluids, people who have had close physical contact with patients should be kept under strict surveillance. Their body temperature should be checked twice a day, with immediate hospitalization and strict isolation in case of the onset of fever.
- Hospital staff who come into close contact with patients or contaminated materials without barrier nursing attire must be considered as contacts and followed up accordingly.

History

The Ebola virus was first identified in a western equatorial province of Sudan and in a nearby region of Zaïre (now the Democratic Republic of the Congo) in 1976 after significant epidemics in Yambuku in northern Democratic Republic of the Congo, and Nzara in southern Sudan.

- Between June and November 1976, the Ebola virus infected 284 people in Sudan, causing 151 deaths. In the Democratic Republic of the Congo, there were 318 cases and 280 deaths in September and October. An isolated case occurred in the Democratic Republic of the Congo in 1977, and there was another outbreak in Sudan in 1979 (33 cases, including 22 deaths).
- In 1989, Reston, an Ebola virus subtype, was isolated in quarantined laboratory cynomolgus monkeys (*Macaca fascicularis*) in Reston, Virginia, USA. From 1989 to 1996, several outbreaks caused by the Ebola Reston subtype occurred in monkeys imported from the Philippines to the USA (Reston in Virginia, Alice in Texas and Pennsylvania) and to Italy. Investigations traced the source of all Ebola Reston outbreaks to one export facility near Manila in the Philippines, but the mode of contamination of this facility was not determined. Several monkeys died, and at least four people were infected, although none of them suffered clinical illness.
- One human case of Ebola haemorrhagic fever of the Cote d'Ivoire subtype and several cases in chimpanzees were confirmed in Côte d'Ivoire in November 1994.
- A large epidemic occurred in Kikwit, the Democratic Republic of the Congo in 1995 with 315 cases, 250 of whom died.
- In Gabon, Ebola haemorrhagic fever was first documented in 1994 (19 cases including 9 deaths). Successive outbreaks occurred in February (37 cases including 21 deaths) and July of 1996 (60 cases including 45 deaths).
- In October 2000, Ebola was reported in Gulu district in northern Uganda. Between September 2000 and January 2001, the Sudan subtype of the Ebola virus infected 425 cases, including 224 deaths, making this the largest epidemic so far documented of Ebola. This was the first reported emergence of the Sudan Ebola virus since 1979.
- From October 2001 to December 2003, several Ebola outbreaks of the Zaïre subtype were reported in Gabon and the Republic of the Congo with a total of 302 cases and 254 deaths.

About 1850 cases with over 1200 deaths have been documented since the Ebola virus was discovered.

Natural reservoir

- The natural reservoir of the Ebola virus is unknown despite extensive studies, but it seems to reside in the rain forests on the African continent and in the Western Pacific.
- Although non-human primates have been a source of infection for humans, they are not thought to be the reservoir. They, like humans, are believed to be infected directly from the natural reservoir or through a chain of transmission from the natural reservoir.
- On the African continent, Ebola infections of human cases have been linked to direct contact with gorillas, chimpanzees, monkeys, forest antelope and porcupines found dead in the rainforest. So far, the Ebola virus has been detected in the wild in carcasses of chimpanzees (in Côte-d'Ivoire and the Republic of the Congo), gorillas (Gabon and the Republic of the Congo) and duikers (the Republic of the Congo).
- Different hypotheses have been developed to explain the origin of Ebola outbreaks. Laboratory observation has shown that bats experimentally infected with Ebola do not die, and this has raised speculation that these mammals may play a role in maintaining the virus in the tropical forest.
- Extensive ecological studies are under way in the Republic of the Congo and Gabon to identify the Ebola's natural reservoir.

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